



Ham Radio Project

Jesse Alexander, WB2IFS



Agenda

- Ham Radio project
- SuperNova LMS Demo
- Re-membering: BIPOC and LGBTQIA holding space in wireless (STEM)
- STEM identity
- How: Curriculum/project design
- Partners
- 73s

Ham Radio Project

Summary

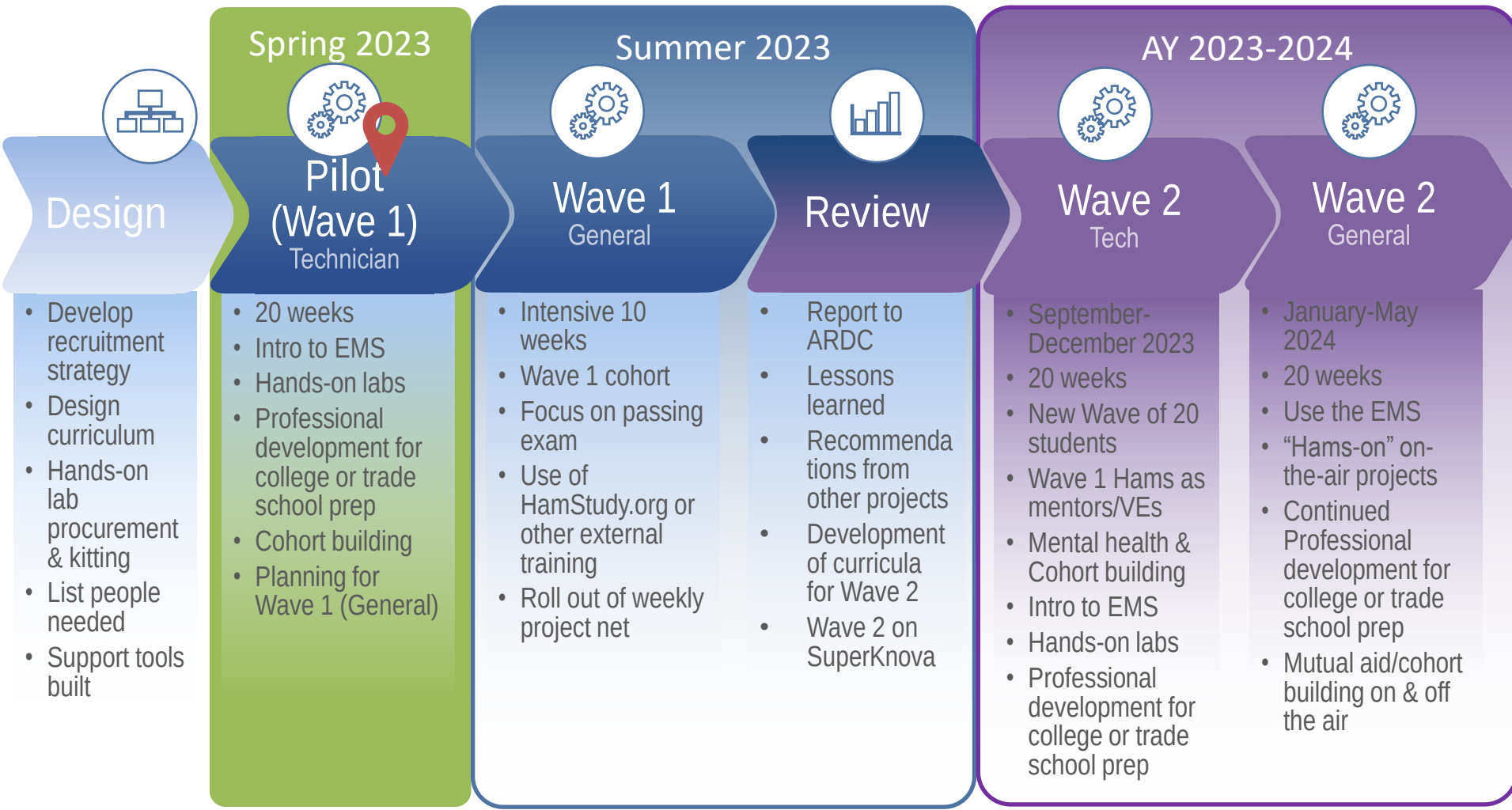
Ham Radio Project Supported by a generous grant from Amateur Radio Digital Communications (ARDC), NRAO is launching a two-year project to engage BIPOC and LGBTQIA+ students in learning about the electromagnetic spectrum and the excitement of amateur radio.

- Start date: January 2023
- 10 students — “Wave one”
- 20 students — “Wave two”
- \$100/week stipends
- Leading to Amateur Radio Technician’s license
- SuperKnova online learning platform
- Weekly virtual sessions to include science, technology, professional development, licensure prep, hands-on labs, and cohort-building



Ham Radio Project

Timeline



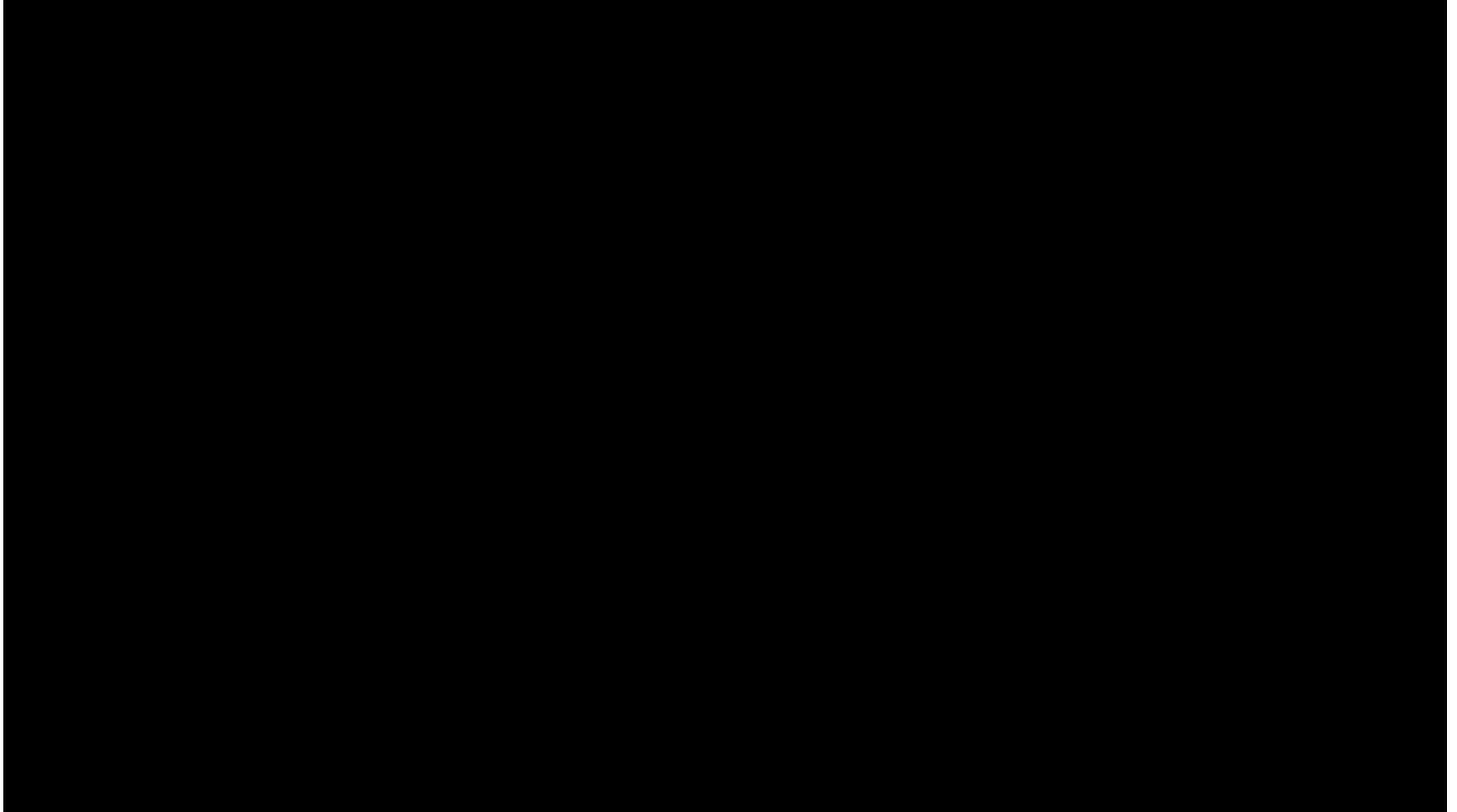
What's in it for...

BIPOC & LGBTQIA+ Cohort	Ham radio community	NRAO community
• Developing a STEM Identity: skin in the game • Ham License is a ticket: experiment, “hack”, DIY, coteach, Make • Future emergency communicators vs. climate emergency • Career guidance: college & trade school Coaching • Visualizing themselves as cocreators of the future	• New people in the hobby: Survival • Movements/issues: • Multigenerational Makers/DIY • Spectrum defense: Non-commercial spectrum use • Opensource, Right to repair • Access to SuperKnova LMS: opensource license Tech & General content for clubs and schools	• Diverse pool of future researchers, techs & craft to continue R&D mission • understands spectrum as a shared natural resource • “muscle memory” knowledge of wireless technology • Increased scientific literacy in society • Open source innovation

See the *Uncertain Future of Ham Radio*: <https://spectrum.ieee.org/ham-radio>

SuperKnova

Demo





BIPOC folk have been astronomers

“Follow the drinking gourd” musical “wireless” communication



BIPOC folk in wireless

We were here and here to stay...

112 THE ELECTRICAL EXPERIMENTER June, 1916

PORTABLE WIRELESS SET OF LIBERT YOUNG.

The author takes great pleasure in sending in this illustration and description of his portable radio station. The receiving front that controls the buzzer test and shuts the detector. A D.P.D.T. switch is also located on the left side, which is a very convenient place. With the exception of the phone and detector all instruments are home made. This station is used mostly for receiving and on favorable nights many distant commercial stations come in very loud.

The sending range is not so great, due to the fact that such a small coil and aerial only 40 feet long and 20 feet high are used. The writer is very much pleased with the results he has obtained with this station and proud to say that many useful ideas about its construction came from *The Electrical Experimenter*. My call is L.Y. and I will be glad to hear from amateurs within a radius of three miles.

LIBERT YOUNG,
Indianapolis, Ind.

CORRECTION NOTICE.

We are asked to state that the station shown on page 626 of our March issue of the magazine is not the property of the Minnesota Wireless Association, but of the American Telegraph School of Minneapolis, Minn.

RADIO TAUGHT IN PRISON.

Wireless telegraphy has been introduced by Warden George W. Kirchover at Sing Sing prison, New York, as a part of the curriculum of the prison schools. Most of the inmates are proficient in "prison wireless," the term applied to the underground system of relaying news to and from the prison, and are expected to quickly master the new system. Henry Leeb, a graduate of the Massachusetts Institute of Technol-

ogy, was the first lecturer on the subject. It is planned to train the operators thoroughly in the use of wireless, so they can take a job on land or sea when released.

THE RADIO SET OF J. Y. PARSONS, JR.

Herewith is an illustration of my wireless station, all of which is home made, with the exception of the spark coil, phones and key.

The receiving set consists of a loose coupler, fixed condenser, variable condenser, single slide tuning coil used as loading coil, 1000-ohm phones, buzzer test and galena, silicon and iron pyrites detectors. In the sending set there is a 2-inch coil, glass plate condenser, spark gap, helix and key. I use dry cells as a source of power for the transmitter. The aerial is 50 feet long and 40 feet high at one end and 50 feet at the other. The instruments are protected by fuses and a lightning switch. Very

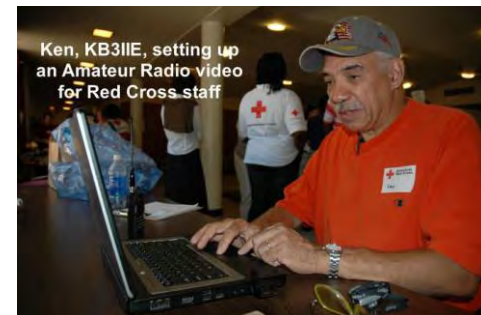
Libert Young's Home-made Radio Outfit.

set consists of a large loose coupler, a Jove mineral detector, fixed and variable condensers and a 1000-ohm Brander's phone. For sending there is used a 2-inch spark coil, an E.I. Co. key, glass plate condenser, a "pancake" helix and a stationary spark gap. These instruments are mounted on a neat cabinet which has a small switch in

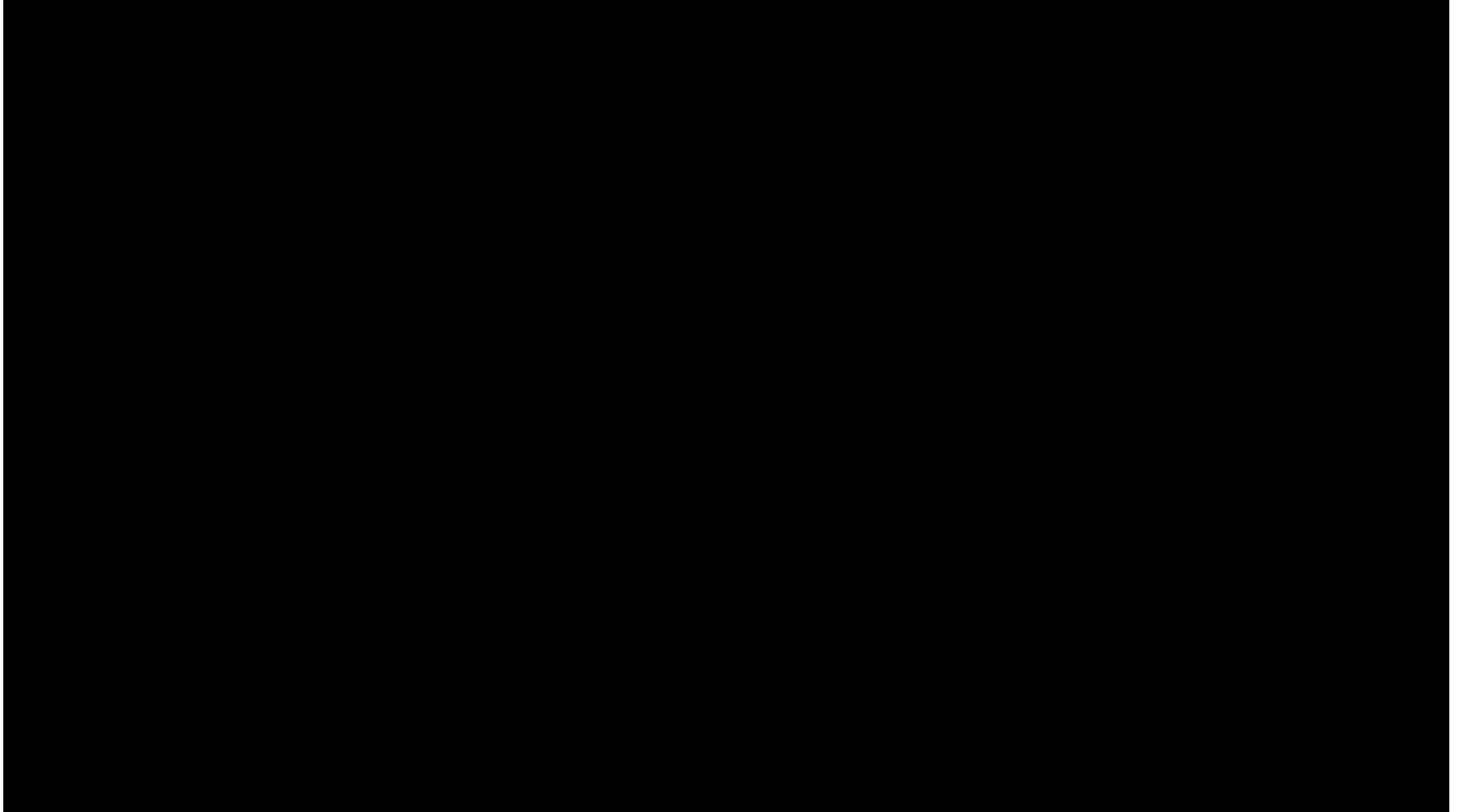
Radio Set of J. Y. Parsons, Jr.

good results are obtained with this

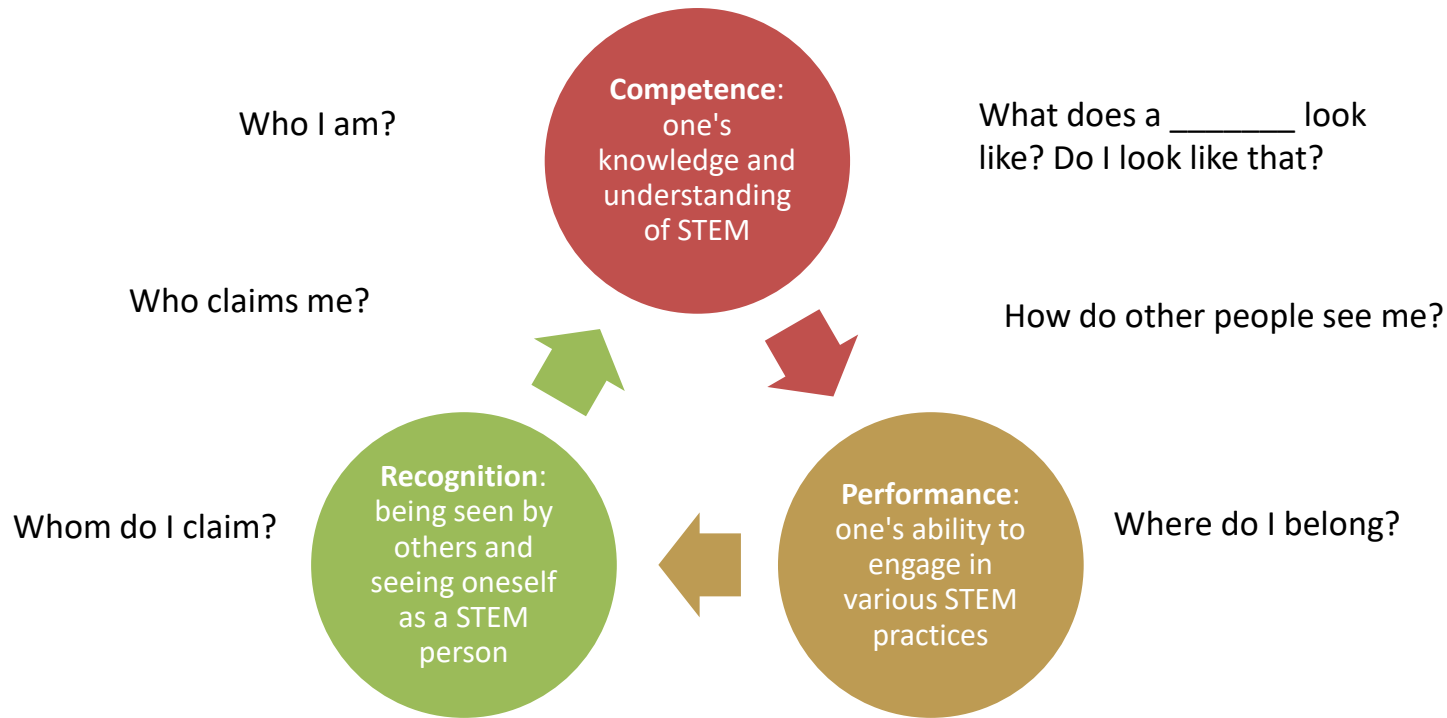
J. Y. PARSONS,
Kansas City, Mo.



Radio and space is a BIPOC place



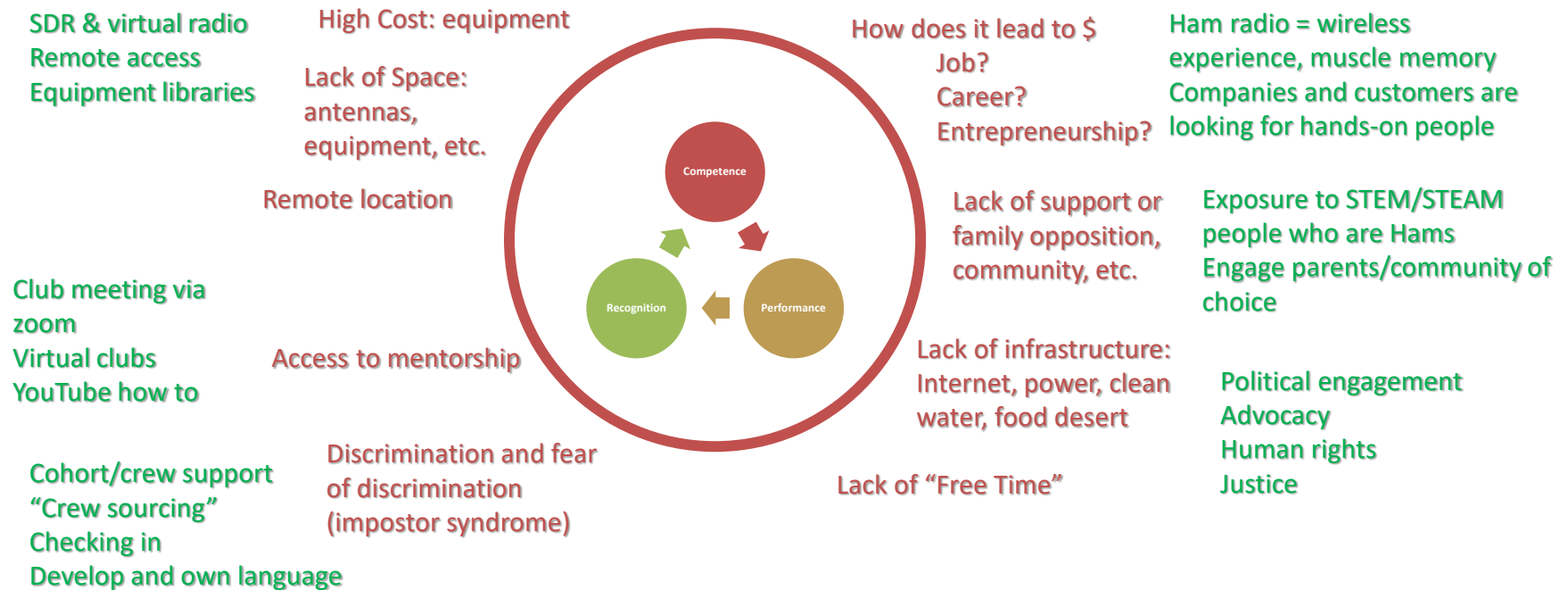
Developing Ham radio (STEM) identity



From **Keynote 3: The importance of developing the STEM Identity of vulnerable student populations**, Dwight Carr, Ph.D. (APL STEM Program Manager) at [13th IEEE Integrated STEM Education Conference, Johns Hopkins University \(Applied Physics Laboratory\), Kossiakoff Center Laurel, Maryland, Saturday, March 11, 2023](#)

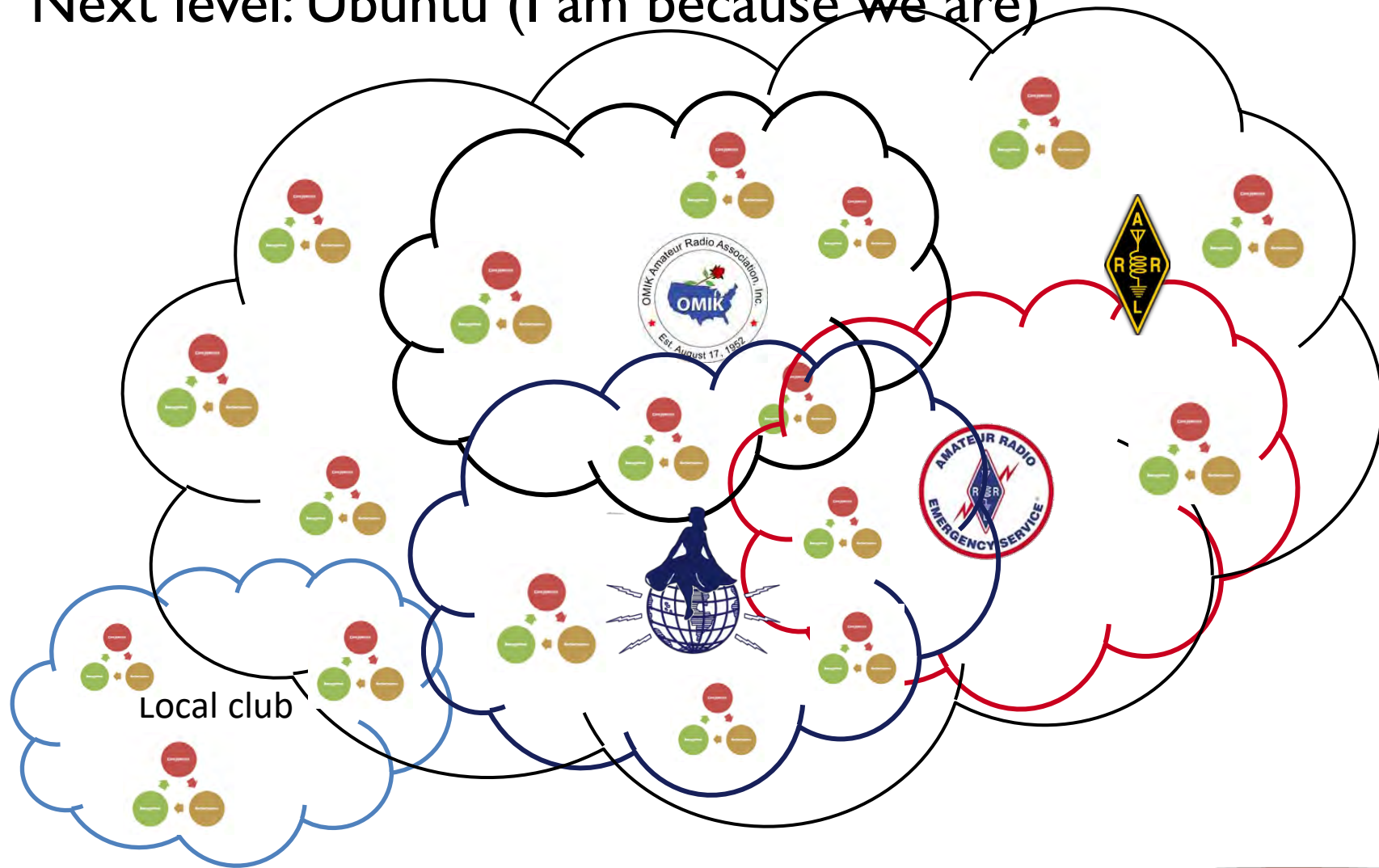
Developing Ham radio (STEM) identity

Barriers



Developing Ham radio (STEM) identity

Next level: Ubuntu (I am because we are)

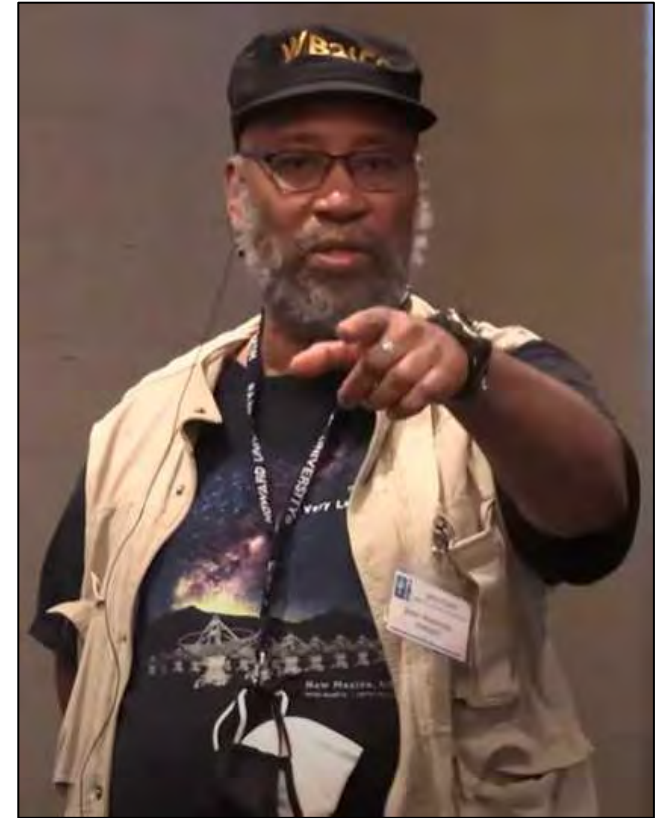


Developing STEM identity

Teachable moment: Are you sure you're in the right place?

- When I arrived, one of the TAPR leads approached me and asked if I was sure that I was in the right place.
- I demurred politely and joked that I noticed all the cars with ham antennas in the hotel parking lot so I assumed that I was at the correct hotel, winked, and stood my ground.
- If I were a different person, younger, and not comfortable in my own skin, I may have walked out
- This is a question I've had to deal with all my life with this Black male body

Ham radio will not change until seeing a Black man as a radio amateur is normal.



This is why **Safe Places** are needed for BIPOC & LGBTQIA+ youth.

Developing STEM identity

Are you sure you're in the right place?



What does a ham radio operator look like?

Why could I find no pictures of a Black or Latinx woman holding a microphone?

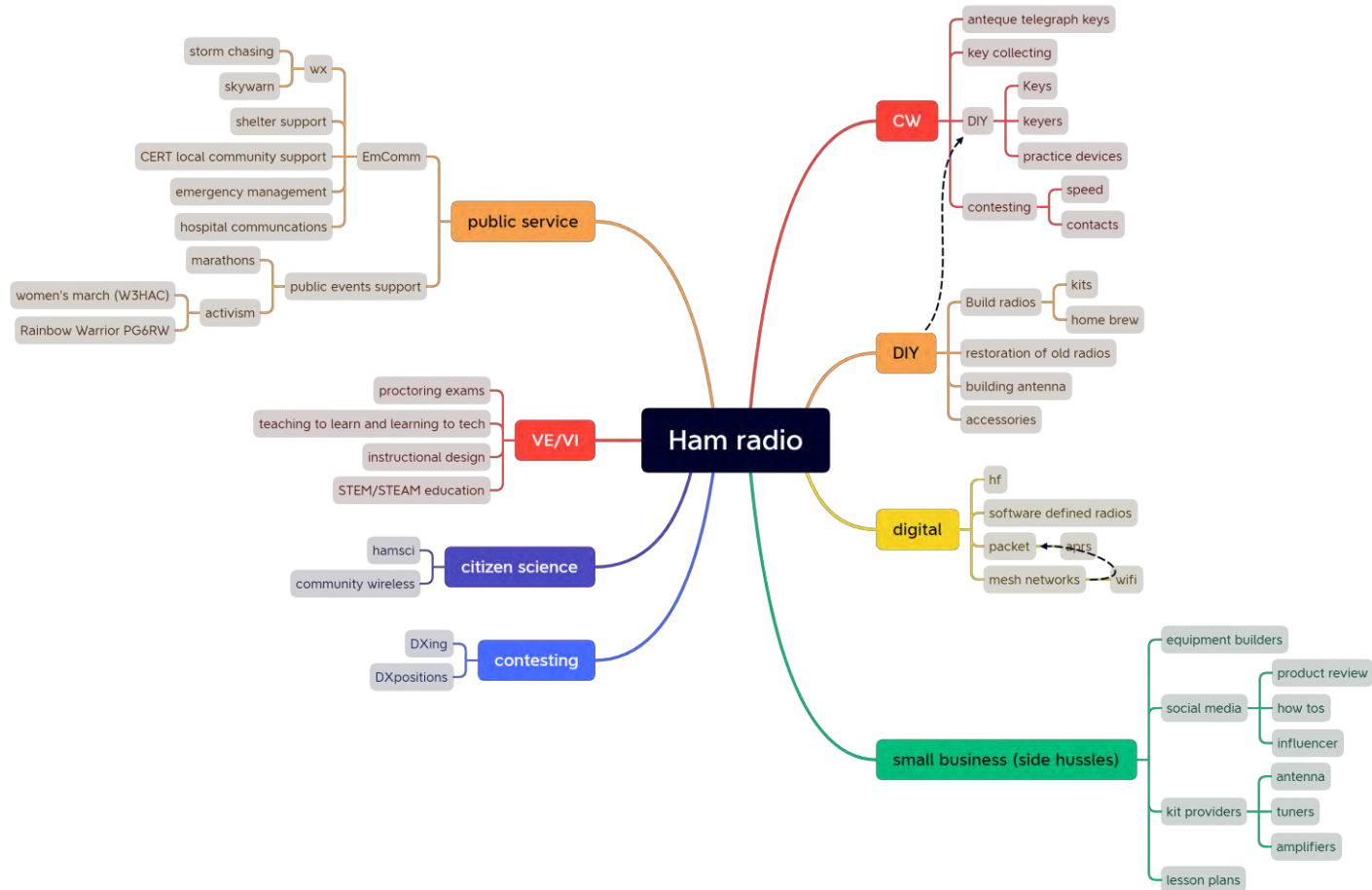
Developing STEM identity

Changing the language: social structure vs. governance

Term	Meaning	Problem	Suggested alternatives
Elmer	Mentor, helper, guide, etc.	Gender specific	Mentor
YL	Young lady (unmarried women)	Gender specific reference to unmarried woman regardless of age. Why is marriage important?	NF = new friend OF = old friend
OM	Old man (as in “old boy’s network”)	There’s no term for young man or those who are nonbinary.	NF = new friend OF = old friend
XYL	X-young lady (hams wife)	What if she or they are <u>the</u> ham?	

Developing STEM identity

Where do I fit? Amateur Radio Subhobbies

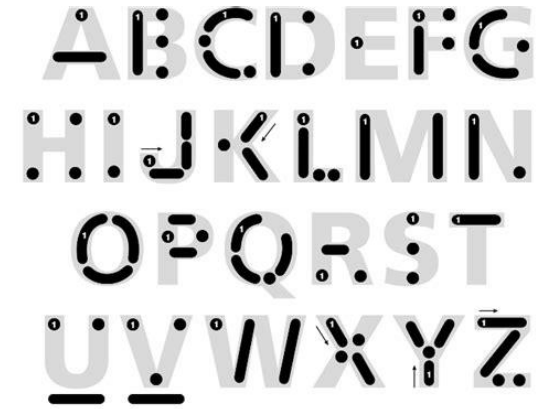


Presented with xmind

Morse code is dead...Long live Morse Code!

An “elective” in license course

- Say your name
- Resurgence in Morse Code—computers as transceivers
- Musical communication (Return to the drum)
- Note the subtle beat of the dits that underlies well sent CW



Visual symbolic representation of the morse code alphabet © Copyright 1999, AG Reinhold, Cambridge, UK — Crypto Museum — www.cryptomuseum.com



Emergency communications (#EmComm)

Community service opportunities for young hams

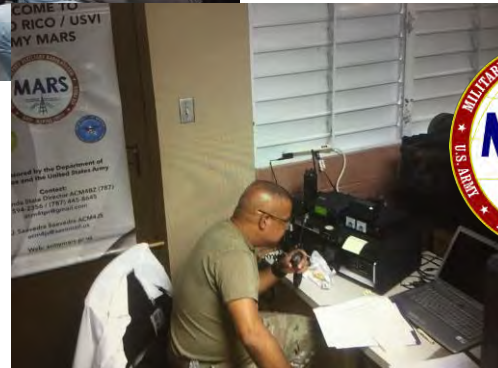
- Volunteer licensed amateurs who provide communications when disaster strikes.
- ARRL program



- Salvation Army Team Emergency Radio Network
- International fellowship of ham radio operators that communicate to and from disaster sites around the world
- Salvation Army Program



- Help your neighbors during an emergency until first responders arrive
- Open to Ham and non-hams
- FEMA program



- Assist the military when traditional communication systems fail
- Civilian auxiliary of licensed amateur radio operators
- US Department of Defense

- Volunteer licensed amateurs who provide communications when disaster strikes.
- FCC program managed by state emergency management agencies
- often the same team/organization as ARES



- Volunteer program of trained severe weather spotters
- Ham and non-hams
- Learn about WX!
- US National Weather Service

Developing STEM identity

A New Amateur Code

- ✓ **CONSIDERATE**...An amateur understands that their license to operate is a privilege and that the spectrum is a natural resource shared by all.
- ✓ **LOYAL**...An Amateur offers loyalty, encouragement and support to other amateurs, local clubs, the [International Amateur Radio Union](#) (IARU) Radio Society in their country, through which Amateur Radio is represented nationally and internationally.
- ✓ **PROGRESSIVE**...An Amateur is curious. An Amateur is enthusiastically and continuously learning new techniques, technologies, countries, and cultures with the understanding that everyone is an Amateur.
- ✓ **FRIENDLY**...An Amateur is patient and friendly with beginners; offers kind assistance, cooperation, and consideration for the interests of others. These are the marks of the amateur spirit.
- ✓ **BALANCED**...An Amateur understands that radio is a hobby, and that amateur activities should be in accord with family, work, school, or community responsibilities.

In the spirit of Ancestor Tony Morrison: “If there’s a book that you want to read, but it hasn’t been written yet, then you must write it.” And with the heart of a true Hacker, I offer a new version of the [Amateur code](#) as my gift to the next generation amateurs.

Curriculum Design Approach

**Packs over lone
wolves**

Ubuntu over heroes

**Prototypes over
finished products**

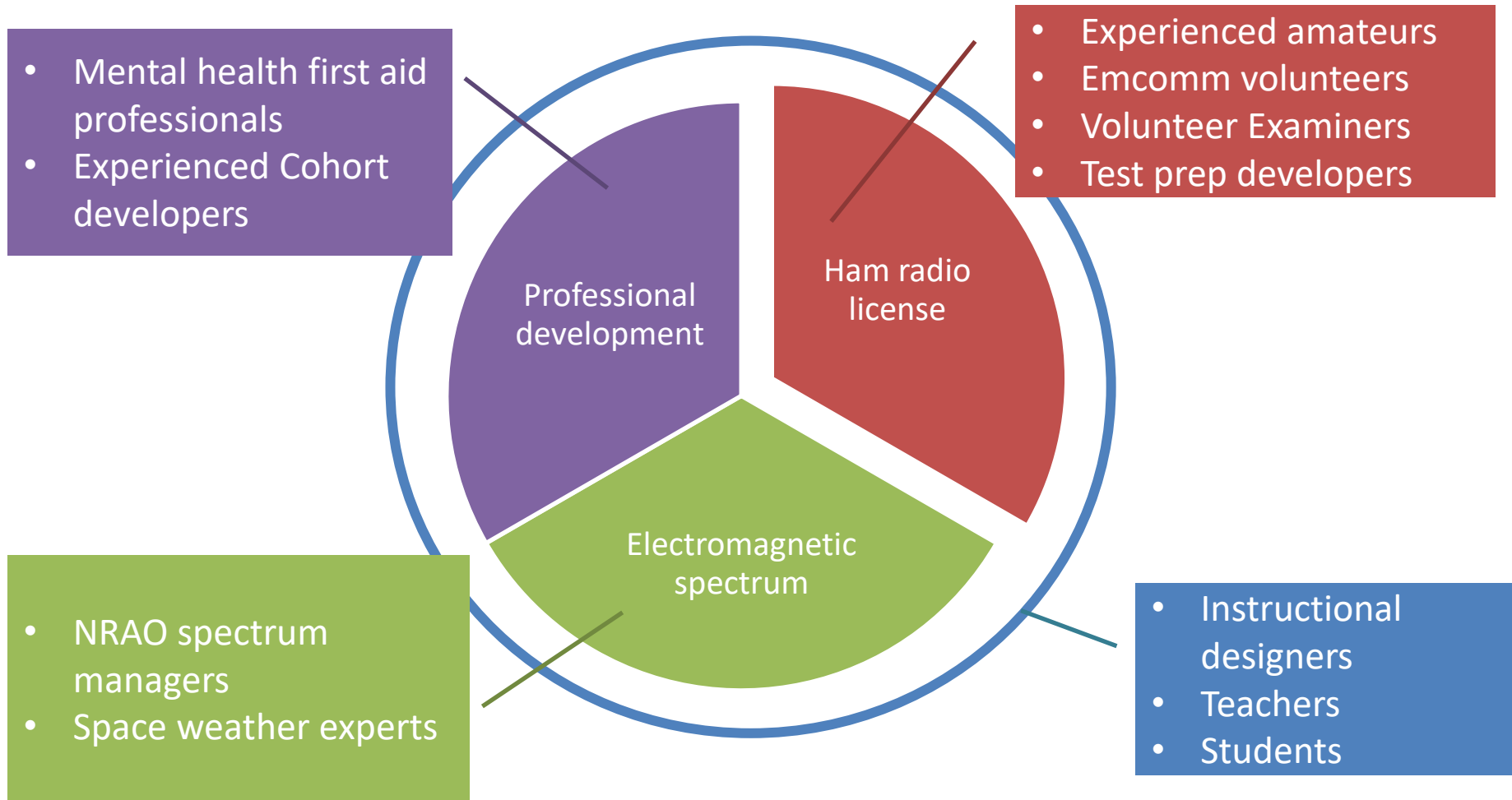
**Amateurs over
experts**

**Evolution over
perfection**

**Learning over
Knowing**

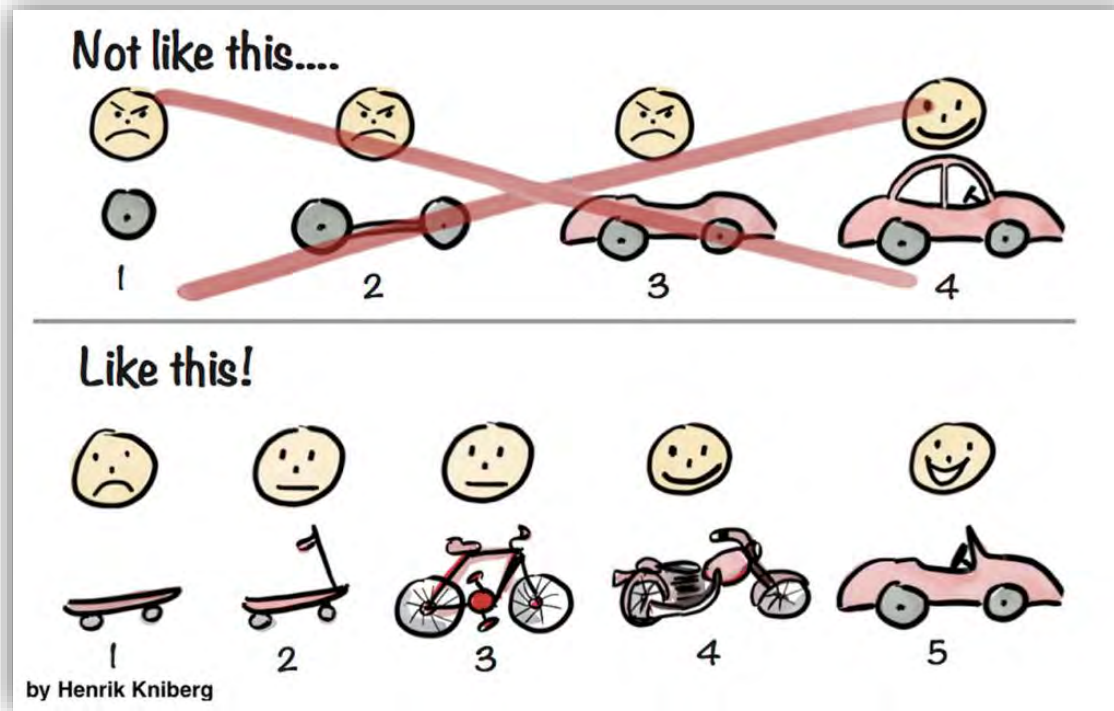
Curriculum Design

Components and delivery SMEs



Curriculum Design

Minimum Viable Product (Curriculum)



- Borrowed from IT
- Usable product after every iteration
- “greenfield” or prototype shared with the Students
- Collaboration and cocreation with the Students via Discord
- Open source

Curriculum design

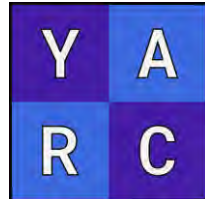
Cohort building

- Linking students with local, national, & international clubs
 - Offering financial support for membership
 - Virtual ham club on Discord:
<https://discord.gg/h9VQsfnmYC>
- Office hours
- Email support
- I-on-I interviews



In Partnership with...

Thanks to our mentors (FKA
“Elmers”)



- [Amateur Radio Digital Communications](#) funded this project, offered guidance & support
- [ARRL](#) is providing license manuals and other learning materials.
- [HamSci](#) has expressed interest in cocreation and collaboration on new opensource research projects
- [TAPR](#) (Tucson Amateur Packet Radio) provided a forum for us to announce our program and collaborate with potential partners
- [Young Amateurs Radio Club](#) is providing technical & administrative support for our discord server

Looking to partner with...



Help wanted ideas

- Subject matter experts (SME):
 - knowledge keepers in their chosen field
 - Shares knowledge during a virtual discussions with the students
- Mentors:
 - Provides advice and help on a 1-on-1 basis
- Potential partnerships



Scan for my
card



Name: Jesse Alexander, WB2IFS/3

Role: Ham Radio Lead

Where I Live: Clinton, MD, USA, Grid Reference FM18ns

What I like to do outside of work: Poetry, Comic books, sci-fi

Amateur Radio sub-hobbies: Emergency Communications, hacking electronics, CW, digital communications (DMR, APRS, FT8, etc.)



Resources

Further reading

Truth about
the future of
education

Required
reading for
BIPOC & allies

Classic guide to
Black STEM
contributions

Buy this book:
NOW!



Ground truth about
how innovation
happens

Required reading
to understand the
Indigenous
experience

Complete book and article lists:
https://linktr.ee/nrao_hamradio





Questions?





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